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SOME OBSERVATIONS ON THE URBAN TRANSPORTATION PROBLEM

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CITY PLANNING DIVISION

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SOME OBSERVATIONS ON THE URBAN TRANSPORTATION PROBLEM*

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SYNOPSIS

To provide a setting for a discussion of the problem of urban transportation, the interrelationship of urban development and transportation is sketched. A series of observations pertaining to the urban transportation problem, as it now must be considered, is then presented.

When we have a large problem, we must usually attack it by parts. However, our chances of success are improved if we have an over-all strategy. As we attempt to meet the transportation problem in our large cities today, we act as if we were tackling separate problems, by short-term expedients. We certainly lack policies based on an over-all view.

It should be obvious that the various elements of the urban transportation problem are interrelated, that alterations in one phase of transportation facilities and services can markedly affect some of the other phases,—and sometimes adversely. Yet, while many measures for facilitating the movement of people and goods in our congested urban areas are earnestly and sincerely advocated as means of improving transportation services, taken collectively the various proposals for relief often appear as aggregations of contradictions.

Whether it is possible to develop a unified transportation policy for an urban area, I do not know. But if we can improve our understanding of the effects of various transportation factors on the functioning of a community, at least we would be better prepared to appraise the numerous proposals which are being urged.

My purpose today is to attempt to provide some perspective on this urban transportation problem. The picture will not be complete, because there are many blanks that cannot be filled. Other members of this panel are scheduled to discuss specific phases of the problem.

Interrelation of Transportation and Urban Development

As a first step in attempting to provide some perspective on our urban transportation problem, I should like to present a sketch of the development of our urban pattern as related to the availability of transport service. This sketch is in the form of a model. However, the model has four dimensions, so I couldn't bring it in the room. Each of you will have to help me by building it, in his own mind, and then by looking at it with his "mind's eye."

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To view this model properly you have to get into a frame of mind. Perhaps many of you have been to a planetarium, where the celestial sphere is represented on a domed ceiling and in a space of an hour, as a detached observer floating in the universe, you can watch the movement of stars and planets which would require years or even centuries. Or perhaps you have watched a mechanical model of some industrial process; standing in a dim room you watch in a lighted display window a representation of, say, the mining of ore, its handling through miniature conveyors, its refining processes, and finally the emergence of various manufactured goods.

In examining our mental model, let us imagine that we are suspended in a kind of sling chair above an area of land, in the central part of which is the city whose growth and development we are going to watch take place in the next few minutes. The model is brilliantly lighted, and we are equipped with a pair of magic binoculars so we can see details, as well as get an over-all view. The time at the start of operation of the model corresponds to the 1830's. The city represents an average, medium-size city of the time, but destined to become a metropolitan center.

Prior to starting the operation of our model, remember that in their daily activities, except for a few more opulent citizens, or some individuals like the doctor, most of the people walked to where they had to go,—to work, to the store, to market, to church, to school. Industries were relatively small and the workers lived close by. Many small businesses were conducted on the same premises where the owner lived with his family. The size of the place was pretty much limited by the fact that it functioned in considerable degree on a "shanks mare" mode of transport.

Now we start the model in operation. A mass transportation system in the form of horse-drawn cars is established. Now for a moderate cost, many more men and their families can go about the city faster and with less effort than they could walk. The business section develops and becomes more specialized, because owners, clerks and shoppers can live at some distance. Some factories become larger, because they can draw workers from a greater radius. And the city gradually expands, as improvements in speed, comfort, and scope of the public system of conveyance follow in fairly rapid successions. Schedules, tandem cars, steam dummies on the major routes, gradually make public transportation on fixed routes a part of the urban way of life.

Something like 50 years pass and the electric street car makes its appearance. These electric cars can carry people twice as fast as the horse car and three times as fast as they can walk. The people have an even broader choice of where to live and work. Expansion is accelerated, and specialization of economic function in parts of the city is more greatly emphasized. Trolley lines are now extending outward from the central area of the city, bringing about development of new residential areas. Some businesses and factories develop along the main trolley routes and more homes are built within walking distance of feeder routes to the main arteries.

We are now about 80 years along on our time scale and it is 1910 A.D. Nearly 90 percent of the people ride to work and to most other places on streetcars. Streetcar operation on extended routes has made the central business district easily accessible to large numbers of people. As a result, the central business district becomes compact, downtown land values soar, and skyscrapers shoot up. There is appreciable congestion on the downtown streets, what with horse-drawn drays, hacks, streetcars and many people. There is talk of building an elevated or a subway like they have in Chicago or New

York, but it is costly, and it's a problem to decide in which direction the first line should be built; besides the interurban which operates partially on private right-of-way doesn't do so badly.

But now a new vehicle, the automobile is gradually appearing on the streets, and as its price is gradually lowered by an industry that is embracing mass production, many people buy and operate one, and are pleased to have dependable transportation in a private package. While in 1890, people could live three miles from the heart of the city and get downtown in 30 to 45 minutes, by 1920 they can get there by automobile in 10 to 15 minutes. With a few more minutes of travel time, they can live still farther out, or they can build homes in the rather sparsely settled tracts between the now extended trolley routes. The star-like pattern of growth begins to fill in; an over-all pattern of development begins to emerge, although it is spotty, because clusters form around former villages or new satellite communities spring up around a rudimentary small business community.

At this point, we might rest our eyes for a moment, by interpolating the thought that the real city limits (i.e., limits of the urban complex, not political boundaries) are set by time rather than distance. A basic feature in the functioning of a city is the interchange of goods and services on a daily basis. For interchange within this time scale, the speed of transport, in appreciable measure, conditions the functional size of the community. This, of course, has been strikingly illustrated by the character and rate of growth of our model city.

Now, returning to our model which is still working, we note that new things are taking place. The public transportation system has ceased to be a monopoly. Competition between the streetcar and the automobile is becoming more marked and more complex. Because it is providing flexible, convenient and rapid personal transportation, the automobile is beginning to attract many users who can or otherwise might have used the streetcar. But in addition, the automobile is beginning to compete for space on the city streets. Congestion is mounting, but is partially allayed for a while by street widening programs, and the building of boulevards and arterials, by traffic facilitation devices. Nevertheless, a long-term decline in the use of mass transit is becoming discernible.

The use of the automobile is now accelerating, creating some new situations. For example, if we look closely, we will note that the line of cars at the curb is not moving, they are parked, thus further cutting down the space for movement. There isn't enough space at the curb, so a new business is developing, the parking lot and the parking garage.

Perhaps an even more significant result, however, of the jammed streets is the fact that elapsed travel time from home to work or to shop or to visit the doctor is now increasing; for people in many of the suburbs, the time to make the trip downtown by either automobile or public transit (which now includes a variety of busses) is approaching the point of being intolerable, at least as a daily matter. And, so we observe that many of them are shopping, going to the doctor and the like in satellite business areas which are becoming a prominent characteristic in our city pattern; even many large factories and warehouses are moving out of the so-called industrial district to open land areas at or beyond the edges of the city. All such moves are requiring more and more transportation service.

This now brings us up to a point in time roughly corresponding to about 1955 A.D. Before turning off the model we might make one observation relative to the business nuclei that are springing up. There appears to be a new

kind of competition developing here, an economic competition between the satellite community and the central business district. This will probably complicate efforts that might be made in our model city to establish rapid transit routes.

And in leaving the model to turn our attention to other matters, I should like to offer one final comment concerning it: I doubt if we can make it run backwards, ingenious though it may be.

Factors in the Urban Transportation Problem

As a second step in attempting to contribute some perspective on our general problem, I should like to offer a condensed series of observations concerning transportation in urbanized areas. Not all the concepts presented can be considered as exact or unchanging; rather, the intent is to provide a general summary of factors which may be useful in appraising current developments.

1. When daily travel times rise above some tolerable value, people tend to alter their commuting patterns. There appears to be a maximum travel time which the average person is willing to spend on daily trips for various purposes. As a corollary to this we observe that the general limits of daily movement in an urban community appear to be set by time rather than distance. We note that technologic advances in transport, which made possible higher speeds, were accompanied by expansions in urban size and shifts in urban pattern. However, little appears to be known factually concerning tolerable journey times or the range in tolerable journey times,² although there has been considerable opinion and speculation.
 2. Delays, inconvenience, rising costs, resulting from congestion cause shifts in travel habits. Some congestion is a natural result of the aggregation of human beings in urban communities. Up to some point, the behavior of the majority of people will not be markedly or adversely affected by congestion. But beyond that point, congestion may become intolerable to appreciable numbers of people, and they will react so as to avoid the congested area as much as possible. Deciding factors, however, in influencing individuals to shift their transportation habits, will be not so much congestion, per se, but increased travel time, delays that are judged to be intolerable, inconvenience and increased costs.
 3. The pattern of urban growth and functioning is conditioned by the kind of transportation available. Urban growth when transit was the dominant mode of transportation, took place along and close to the transit routes; central business districts tended to be compact with high land values. Communities that have grown and developed predominantly with the automobile as the mode of transportation show a more diffuse pattern. The development of vast suburban residential areas has been made possible by a supply of this flexible, individualized transportation within reach of large numbers of people. The average density of population in cities that have undergone great growth and expansion during the automobile age is in striking contrast to cities which saw their major expansion during the streetcar age. It appears now that mass transportation cannot be supplied to the great outlying areas at a fare and service level that will induce a
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2. Tolerable travel times are probably affected by habit and differ as between small towns and metropolitan areas.

sufficient number of people to become transit riders so that general street transit operations can break even.

4. With respect to technical efficiency, mass transit is superior to the privately-owned automobile in moving large numbers of people from one location to another within a relatively congested urban area. In our large cities we still place much dependence on transit for moving a large share of the people during peak hours. Further, it is difficult to see how we could accommodate in our present central cities, the number of automobiles which would be used if all the peak-hour transit riders had to use private passenger cars.
 5. Higher transit operating costs have resulted from the trend toward high ratio of peak-to off-peak-hour patronage. The present pattern of transit usage, namely high peak-hour loads with very low off-peak hour patronage has resulted in disproportionately high operating costs in comparison with income under present fare structures. Attempts to adjust income to expenditures by raising fares and cutting off-peak-hour service have been accompanied by further decrease in patronage during off-peak hours.
 6. Slower transit schedules resulting from congestion contribute to decreased patronage, increased costs. Congestion in the streets has resulted in not only slowing the movement of automobile traffic, but has slowed transit schedule, especially during rush hours, which in turn has made transit riding less and less attractive, so that there is a tendency toward decreased transit riding during peak hours as well as during off-peak hours. Additionally, operating costs are further increased and the efficiency of transit as a mass carrier is reduced, under these conditions.
 7. Parking supply is now an important factor in placing ceiling on the number of cars which can be accommodated in business districts. It appears that the supply of parking,³ together with the pricing of parking,³ is becoming an important determining factor along with travel time, in determining how many cars will come into a central business district. Travel time plus limited parking capacity tend to place a ceiling on the number of cars that can provide transportation service into the downtown areas; this appears to be contributing to the establishment and success of suburban shopping and business centers. These, however, may also reach ceilings due to the same factors which in turn tends to contribute to a proliferation of such centers and a diffuse pattern of urban economic activity.
 8. The uses of the public streets both as arteries for traffic flow and for vehicle storage are in direct conflict. Community decisions to provide large off-street parking programs are in effect the development of a policy to resolve this conflict, but usually the community policy does not go all the way; much curb parking is often retained; not are such efforts commonly coordinated with the capacity for ingress by expressways or improved arterial street systems.
 9. Decline of central business district is not inevitable, but strong policy is necessary to prevent further deterioration of transport services which can
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3. Policy with respect to encouraging short-time parking vs. long-time parking would influence the total number of cars which could provide transport service per day in a business district; this would also affect peak- vs. off-peak hour traffic loads on the streets and the problem of transit usage.

affect the central business district. It appears that the central business districts of some of our cities have reached a ceiling or plateau of economic activity. However, marked deterioration in the quantity and quality of present transport service can conceivably lead to an appreciable decline. The situation does not appear to be stable. But at the present time we do not have the statistics to estimate trends with assurance, nor do we have an over-all urban transportation policy on which we can with confidence rely to promote stability.

10. Mass transit, either rapid or local, is no longer a monopoly. Yet tax and regulatory policies which evolved when transit was the only form of public transportation are still applied, in some degree, to transit operations. Policies which would permit carriers to adopt transit operations to current conditions would appear to be worthy of formulation and serious consideration.
11. Rapid transit cannot be expected to operate successfully unless conditions favorable to inducing large volume patronage are created. Successful rapid transit operations which have so far been instituted appear to be associated with two population characteristics: (1) a large total population, and (2) a high density of population. These characteristics have assured mass origins and destinations of large volume patronage on selected routes. Large passenger volumes are necessary to provide revenue to underwrite investment in very costly facilities. A problem facing communities with a diffuse pattern of residential development is that of obtaining mass origins. Some students of the rapid transit problem claim that to make a new system work, riders must be collected at stations to which they can drive and park with ease, and patronage must be induced by superior service.
12. Our current pattern of urban transportation management, if management it can be called, is chaotic; coordination appears to be essential for healthy operation. The responsibility of design and construction of the street, road and expressway systems lies in departments of state, city and county government, plus special districts in some locations. The routing and operation of transit systems lies in a separate department of city government or in a private company. The maintenance and servicing of streets, lights, and the utilities which lie along the streets are in still different departments. The control of traffic movement usually lies in another and separate department. The regulation of public carriers lies in one or more separate agencies of state and local government. The general urban planning functions are carried out in again another department. The lack of adequate coordination between these diverse management functions is well known, but perhaps more serious is the fact that this kind of management pattern has also severely lessened the possibility of an over-all transport policy being evolved by those directly concerned. This in turn has prevented the presentation of any coordinated policy to the citizens of the community, on whom the final endorsement rests.

SUMMARY COMMENTS

It is believed by many that further attack on the urban transportation problem requires comprehensive and coordinated treatment, and consideration of complementary and alternate forms of transportation, if maximum efficiency in our transportation is to be achieved at minimum costs. Especially to be

considered in the large metropolitan areas are the interrelationships between the provision and use of facilities for automobiles and the offering and use of mass transportation service. A coordinated and comprehensive approach would require coordinated planning of facilities and their operations. Coordinated planning in turn, to be defensible and realistic, would require a backlog of factual information and a factual appraisal. Further, an effective scheme of management of all the complementary forms of transportation, a scheme which results in efficiency but retains the essence of our democratic processes, would have to be found. And finally, new problems in financing, both with respect to source of funds and to allocation, would have to be solved.

Perhaps no one will disagree with the view that a coordinated attack holds the best promise of success in alleviating urban traffic congestion and improving transportation service. The questions still remain: How can such an attack be made? And why hasn't it already started? A part of the answer to the latter question lies in a lack of sufficient basic data. Appraisal of the urban transportation problem is no simple task; the planning and design of adequate and publicly acceptable transportation systems will require the employment of various kinds of technical knowledge and skills, and the use of a great variety of factual data concerning the functioning of urban areas.

In the middle 1930's, most of the state highway departments began the more-or-less systematic collection of data pertinent to the financing, construction and use of rural state highways, data which have since been found to be indispensable to sound highway planning. The urban areas have not been as fortunate with respect to accumulating the statistical tools with which to plan. For one thing, the necessity for the routine collection of basic information was not apparent in most areas, and until recently no apparent urgency existed. No single agency exists to which responsibility for collection of data could be assigned. Thus we are now faced with the situation in which we do not generally have adequate basic facts to permit the kind of a comprehensive appraisal of the problem prerequisite to an all-out attack on it. This is not to say that we have no facts; we do have some. And the recent establishment of a National Committee on Urban Transportation may provide a means of overcoming this deficiency.

It should not be impossible to devise coordinated transportation systems which meet the social and economic needs of the entire population of an area. The devising of such a scheme will require a great deal of patience, wise use of existing laws and the enactment of new ones, fullest cooperation among existing and potential governmental agencies, and a lot of money. One thing is certain: finding the right solution to the transportation problem will require not only the fullest use of technical knowledge and skills but also the widest citizen participation. After all, it is the people who will determine, through their support or lack of it, whether or not the right solution has been found. If it doesn't please them, they won't buy it, regardless of its apparent efficiency. If they do like it, they will pay for it, within considerable ranges in cost.



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c. Discussion of several papers, grouped by Divisions.

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